CALF MILK REPLACER

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Cited documents:

EP0446987
EP0290410
GB2066043
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Abstract of **WO0048474**

The invention relates to milk replacer compositions comprising: from 1-20 parts by weight of vegetable protein concentrate or isolate; and from 8-20 parts by weight of a carbohydrate source comprising 10-90% processed starch and 90-10% maltodextrin, together with whey powder and/or delactosed whey powder and/or whey protein concentrate, fat and additives.

CALF MILK REPLACER

Description of **WO0048474**

CALF MILK REPLACERIntroduction :
This invention relatesto"zero milk"calf milk replacer compositions containing high levels of vegetable protein and carbohydrates.

State of the art:
The use of calf milk replacers in calf feeding is a well established practice. Basic ingredients are skimmed milk powder and vegetable or animal fats. Because of increasing shortages and increasing prices of skimmed milk powder, alternatives have been sought to replace part or the whole of the skimmed milk component. At first by-products of the milk industry, such as whey powder, delactosed whey powder, whey powder concentrate and/or casein have been used to replace the skimmed milk powder. Also vegetable proteins, such as modified wheat gluten and soy protein isolates or concentrates have been used as replacement proteins for the milk proteins.

Other ingredients used in such calf milk replacers are a. o. lactose, starch, dextrose or wheat flour. The starch and wheat flour can be pre-processed by extrusion, heat moisture treatment and/or enzyme treatment. When using non-dairy protein sources, essential amino acids may be added to re-equilibrate the amino acid spectrum of the compositions.

Because nowadays dairy by-products, such as whey powders
and whey concentrates are finding more profitable outlets
in human nutrition, prices of these by-products increase, making these materials less attractive for feed applications.

Therefore there is a need for ingredients applicable in calf milk replacers, especiallyin"zero milk" compositions, which are able to replace skimmed milk powder and also a part of the whey based ingredients.

However, replacement of milk-based ingredients by vegetable protein and carbohydrate sources should not result in reduced feed performance compared to the standard calf milk replacer compositions. Feed performance parameters concerned are a. o. feed conversion and drinking refusals. Drinking refusals are considered to become serious when more than2% of the fodder is not consumed during the feeding periods. In the case of calf milk replacers based on skimmed milk powder, typical values of < 1% are observed.

Typical"zero milks"are composed of whey powder in combination with whey protein concentrates or a vegetable protein source, a fat source and a carbohydrate source.

Carbohydrates can be added as lactose, dextrose or, starch or as a mixture thereof. Such zero milks have already been disclosed in EP-0 446 987.

Further substitution of the whey powder in these zero milk's, by a vegetable protein source and a carbohydrate source is considered as economically attractive, because of the lower price of some of these ingredients, provided that drinking refusals and feed conversion do not substantially deviate from the standard values.Less than 2% refusals are considered as acceptable; values above 2 and 3% are considered as unacceptable.

However, during testing of zero milks with reduced whey contents, applicants observed significant increases in drinking refusals when part of the whey powder fraction was replaced by a non-milk protein/carbohydrate whey replacer.

Typical protein sources which can be used in these whey replacers are vegetable proteins such as native or modified wheat gluten, soy proteinsot other suitable vegetable protein concentrates. Carbohydrate sources which can be used are e. g. pregelatinised or degraded starch, maltodextrins, corn syrup solids or dextrose. As a carbohydrate/protein mixture extruded wheat flour has been described as a substitute for

whey powder.

Whitin the framework of applicant's research to find a solution for the above problem, is has now surprisingly been observed that the increased number of drinking refusals returned to normal when, instead of using a single carbohydrate source such as starch or maltodextrin, the carbohydrate part of the whey replacer was composed of a combination of processed starch and maltodextrin. It can thus be stated that a synergistic effect occurs when combining a processed starch with a maltodextrin.

Description of the invention :
Accordingly this invention relates to calf milk replacer compositions, containing substantially no skimmed milk powder, and which are characterised in that they comprise: -from 1-20 parts of vegetable protein concentrate or
isolate -and from 8-20 parts of a carbohydrate source
comprising10-90% processed starch and 90-10%
maltodextrin, together with whey powder and/or delactosed whey powder and/or whey protein concentrate, fat and additives.

The vegetable protein part can be a. o. a modified wheat gluten, soy isolate or concentrate, or other suitable vegetable protein concentrates, or mixtures thereof. The modified wheat gluten used can be enzymatically modified, chemically modified, deamidated, or extruded wheat gluten, or a mixture thereof.

The processed starch component can be an extruded starch, an enzymatically degraded starch, a (pre) gelatinised starch or a mixture thereof. The starch component can be provided by means of an extruded cereal flour.

Preferably the starch component is originating from extruded wheat flour.

The maltodextrin component is characterised by its DEvalue which can vary between 10 and 35. Preferably a maltodextrin having a DE between 12 and 20 is used.

In a preferred embodiment of the invention the vegetable protein component is a modified wheat gluten protein.

In a more preferred embodiment of the invention the modified wheat gluten fraction is composed of 1-10 parts extruded wheat gluten, originating from extruded wheat flour, and 99-90 parts of an enzymatically degraded and/or a deamidated wheat gluten.

In another preferred embodiment of the invention the carbohydrate source is composed of30-70% processed starch and70-30% maltodextrin.

In a further preferred embodiment of the invention the zero milk composition contains from 1-18 parts of an enzymatically degraded or a deamidated wheat gluten, in combination with 10-20 parts of a carbohydrate source composed of30-70% extruded wheat flour and70-30% maltodextrin having a DE between 12 and 20.

In a most preferred embodiment of the invention the carbohydrate source is composed of 40-60% processed starch and 60-40% maltodextrin, having a DE between 12 and 20.

For a better understanding of the invention, the following example, illustrating the invention, is provided.

Example :
A feeding trial was performed using five groups of 14 bull calves having a starting weight of about 50 kg. The calves were first fed with a skimmed milk based starter composition, during the first six weeks of the trial.

This starter composition was then gradually replaced, respectively by a grow reference, and by compositions 1, 2a, 3a and 4a as displayed in table I at page 7.

After the seventh week no more starter was fed. From the ninth week on compositions 2a, 3a and 4a were gradually replaced by compositions 2b, 3b and 4b. Composition of these milk replacers is also given in table I at page 7.

- Feeding was continued until the 18th week.

At the end of the trial, in total 180 kg of the different compositions were fed to the animals.

The different feed compositions are defined asfollows : -Reference : standard skimmed milk powder based calf
milk replacer composition, fed to reference group.

-Composition 1 : zero milk where skimmed milk powder is replaced by whey based products and modified wheat gluten (fed to group 1).

-Composition 2a & 2b : part of the whey based products from composition 1 is replaced by extruded wheat flour (fed to group 2).

-Compositions 3a & 3b : part of the whey based products from composition 1 is replaced by a maltodextrin/ modified wheat gluten composition in a ratio of 85/15, (fed to group 3).

-Compositions 4a & 4b : compositions according to the invention; part of the whey based products from composition 1 is replaced by a mixture of extruded wheat flour, modified wheat gluten and maltodextrin (fed to group 4).

During the rearing period drinking refusals were noted and added up. For the different groups the following results were obtained.
EMI6.1

<SEP> Reference <SEP> Group <SEP> 1 <SEP> Group <SEP> 2 <SEP> Group <SEP> 3 <SEP> Group <SEP> 4
<tb> Fodder <SEP> refused <SEP> (kg) <SEP> 1, <SEP> 0 <SEP> 0, <SEP> 6 <SEP> 7, <SEP> 0 <SEP> 4, <SEP> 3 <SEP> 0, <SEP> 4
<tb> Refusals <SEP> (%) <SEP> 0,5 <SEP> 0, <SEP> 3 <SEP> 3, <SEP> 9 <SEP> 2, <SEP> 4 <SEP> 0,2 <SEP>
<tb> TABLE I
Composition of milk replacers
EMI7.1

Parts <SEP> Reference <SEP> Comp. <SEP> I <SEP> Comp. <SEP> 2a <SEP> Comp. <SEP> 3a <SEP> Comp. <SEP> 4a <SEP> Comp. <SEP> 2b <SEP> Comp. <SEP> 3b <SEP> Comp. <SEP> 4b
<tb> Skimmed <SEP> milk <SEP> powder50
<tb> Whey <SEP> powder <SEP> 21,8 <SEP> 41,8 <SEP> 46,1 <SEP> 46,1 <SEP> 46,1 <SEP> 35,9 <SEP> 35,7 <SEP> 35,8
<tb> Whey <SEP> powder <SEP> conc. <SEP> I <SEP> 1)--8---------
Whey <SEP> powder <SEP> conc. <SEP> II <SEP> 2)--10,7
<tb> Fat <SEP> (anim. <SEP> veget. <SEP> 50/50) <SEP> 19 <SEP> 18,6 <SEP> 20,8 <SEP> 20,8 <SEP> 20,8 <SEP> 20,8 <SEP> 20,8 <SEP> 20,8
<tb> Modified <SEP> wheat <SEP> gluten--15 <SEP> 15,6 <SEP> 17,1 <SEP> 16,6 <SEP> 15,6 <SEP> 18,6 <SEP> 17,1
<tb> Wheatflour5 <SEP> 3---
Extruded <SEP> wheat <SEP> flour----10--5 <SEP> 20--10
<tb> Maltodextrin/modified--8,5 <SEP> 4--17 <SEP> 8,5
<tb> wheat <SEP> gluten
<tb> composition <SEP> (85/15)

<tb> Premix <SEP> 3) <SEP> 4,2 <SEP> 3 <SEP> 7,5 <SEP> 7,5 <SEP> 7,5 <SEP> 7,7 <SEP> 7,9 <SEP> 7,8
<tb> Total <SEP> 100 <SEP> 100 <SEP> 100 <SEP> 100 <SEP> 100 <SEP> 100 <SEP> 100 <SEP> 100
<tb> 1) Whey powder concentrate with a protein content of 35% 2) Whey powder concentrate with a protein content of 17% 3) special premix for cattle fodder : composition of vitamins, minerals (a. o. calcium and phosphate salts), and amino acids (lysine, threonine, methionine)

CALF MILK REPLACER

Claims of **WO0048474**

C L A I M S 1. Milk replacer composition comprising : -from 1-20 parts by weight of vegetable protein concentrate or isolate
-and from 8-20 parts by weight of a carbohydrate source comprising10-90% processed starch and 90-10% maltodextrin,
together with whey powder and/or delactosed whey powder and/or whey protein concentrate, fat and additives.

2. Milk replacer composition according to claim 1, characterised in that the vegetable protein part comprises modified wheat gluten, soy isolate or concentrate, or mixtures thereof.

3. Milk replacer composition according to claim 2, characterised in that the modified wheat gluten comprises enzymatically modified, chemically modified, deamidated, or extruded wheat gluten, or a mixture thereof.

4. Milk replacer composition according to any one of the preceding claims, characterised in that the processed starch component comprises an extruded starch, an enzymatically degraded starch, a (pre) gelatinised starch or a mixture thereof.

5. Milk replacer composition according to any one of the preceding claims, characterised in that at least part of the starch component is an extruded cereal flour, etruded wheat flour.

6. Milk replacer composition according to any one of the preceding claims, characterised in that the maltodextrin component has a DE-value between 10 and 35, preferably a between 12 and 20.

7. Milk replacer composition according to any one of claims 2-6, characterised in that the vegetable protein component is a modified wheat gluten protein.

8. Milk replacer according to claim 7, characterised in that the modified wheat gluten fraction comprises 1 10 parts extruded wheat gluten from extruded wheat flour, and 99-90 parts of an enzymatically degraded and/or a deamidated wheat gluten.

9. Milk replacer composition according to claim any one of the preceding claims, characterised in that the carbohydrate source comprises 30-70% processed starch and 70-30% maltodextrin.

10. Milk replacer composition according to claim 9, characterised in that it comprises from 1-18 parts of an enzymatically degraded or a deamidated wheat

gluten, in combination with 10-20 parts of a carbohydrate source composed of30-70% extruded wheat flour and70-30% maltodextrin having a DE between 12 and 20.

11. Milk replacer composition according to claim 10, characterised in that the carbohydrate source comprises 40-60% processed starch and60-40% maltodextrin having a DE between 12 and 20.
